



COUNTY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

"To Enrich Lives Through Effective and Caring Service"

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August 17, 2006

ADDRESS ALL CORRESPONDENCE TO:
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IN REPLY PLEASE
REFER TO FILE: D-2

Mr. Mark Christoffels
City Engineer
Department of Public Works
City of Long Beach, 9th Floor-City Hall
333 West Ocean Boulevard
Long Beach, CA 90802-4664

Dear Mr. Christoffels:

**RIVER AVENUE STORM DRAIN
RETENTION SYSTEM
PCA DLBCH15727**

Enclosed is a copy of the Project Design Concept (PDC) report for your review and approval. Please sign the PDC and return a copy to Public Works. This report was discussed with you and your staff on June 20, 2006. All issues and concerns brought up at our recent meeting have been addressed.

Upon your written authorization to proceed with the final design, we will develop a schedule for your review.

If you have any questions, please contact Mr. Mike Soliman at (626) 458-7928.

Very truly yours,

DONALD L. WOLFE
Director of Public Works


SREE KUMAR
Assistant Deputy Director
Design Division

JL:skh
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Enc.

cc: Deputy City Attorney (Lisa Malmsten)

Approved Mark Christoffels 9/26/06
Mark Christoffels

*City desires to move forward
with the 10 year frequency flood
level protection as outlined in
this report.*

PROJECT DESIGN CONCEPT RIVER AVENUE STORM DRAIN RETENTION SYSTEM

Recommendation

Approve the Project Design Concept for the River Avenue Storm Drain Retention System as shown on the plans and described below.

Project Scope

The proposed project in combination with the existing storm drain system will convey flows from a 5-year frequency storm. Two existing catch basins on River Avenue will be upgraded and two new catch basins will be added to collect the 5-year storm flows. The proposed retention system consists of three barrels of 300 linear feet of 72-inch diameter reinforced concrete pipe (RCP) or high-density polyethylene (HDPE) and also 370 linear feet of 24-inch diameter RCP diversion line. The location of the proposed retention system is from Stations 39+89 to 47+35 along the River Avenue Storm Drain, south of Arlington Street (see attached plans).

Per discussions with the City of Long Beach staff, the project will consist of two phases. In Phase I, two catch basins will be constructed to collect an additional 15 cubic feet per second (cfs). In the subsequent phase, the storm drain retention system will be added to the project.

Hydrology and Hydraulics

River Avenue Storm Drain is located in the Cities of Long Beach, Los Angeles, and Carson. The project limits are within the City of Long Beach. The existing storm drain consists of approximately 5,700 linear feet of 42- to 60-inch RCP. It provides drainage for a 237-acre watershed from Carson Street, at the upstream end of the watershed area, to Dominguez Channel along Mchelen Avenue; River Avenue; and a nursery on Edison property. The existing drain has a lateral that consists of 30- to 42-inch RCP. The lateral confluent the existing mainline at the intersection of 223rd Street and River Avenue.

On February 19, 2005, approximately ten homes in the 2300 and 2400 blocks of Arlington Street in the City of Long Beach were flooded during a rainstorm. The homes are located in a sump and are part of the watershed Subarea 18C (see attached hydrology report). The sump is drained by two existing catch basins, and flows are conveyed through a 21-inch RCP connector pipe that outlets into the 60-inch RCP.

The existing storm drain design was based on hydrology that was done in 1957. All calculations in this report are based on a new hydrology report dated November 2005. Based on 2005 hydrology, the peak flow rate from a 5-year frequency storm at the outlet into Dominguez Channel is 111 cfs. The flow rate at the Arlington Street and River Avenue intersection is 105 cfs. For a 10-year frequency rainfall, the peak flow rates at the locations mentioned above are 150.4 and 144 cfs, respectively. For the sump on Arlington Street, the 50-year storm runoff generated by watershed Subarea 18C is 4.5 cfs.

The existing 60-inch drain system was hydraulically modeled with the Water Surface Pressure Gradient (WSPG) program. The model was based on a water surface control of 10.3 mean sea level (MSL) at the outlet into Dominguez Channel, which represents a mean higher high water elevation of 2.7 MSL at the Dominguez Channel outlet into the ocean. Based on this analysis, it was determined that the existing drain has a capacity of approximately 80 cfs at the intersection of Arlington Street and River Avenue. However, the catch basins on River Avenue are restricted and collect only 65 cfs. The street capacity for River Avenue is 11 cfs to the top of curb and 23 cfs to the property line. The existing drain at the outlet to Dominguez Channel has a capacity of 85 cfs.

Flooding Analysis

The cause of the flooding is attributed to an inadequate drainage system. The flooding analysis was performed for the 5- and 10-year frequency storms. The 5-year flow rate for the mainline on River Avenue upstream from Arlington Street is 105 cfs. The mainline has the capacity for 80 cfs but conveys 65 cfs due to restricted catch basins. The excess surface flow rate of 40 cfs flows above the property line on River Avenue. As the flow approaches the intersection of River Avenue and Arlington Street, the surface flow partially diverts toward the sump on Arlington Street. It is assumed that a 50 percent split occurs. The total flow including local flow from Subarea 18C results in a flooding level at 1.3 feet above the property line. Based on a 10-year frequency storm, the flooding level on Arlington Street is 1.7 feet above the property line.

Proposal for a 5-Year Frequency Storm Protection

This proposal is to construct an underground retention system along the existing drain alignment within the nursery property owned by Edison. The excess flow rate of 40 cfs on River Avenue will be collected by new and modified catch basins, which will be constructed upstream of Arlington Street on River Avenue. To fully utilize the existing drain capacity, the modified catch basins will split 15 cfs to the existing drain, and the remaining 25 cfs will be directed to the proposed retention system. The proposed retention system consisting of three barrels of 300 linear feet of 72-inch RCP and 370 linear feet of 24-inch RCP diversion line combined with the existing storm drain system will provide a 5-year frequency protection. The required storage volume for the retention is 0.7 acre-feet. Prior to final design, the existing 60-inch RCP drainage

system should be inspected to ensure that no blocking due to sediment and debris accumulation is present.

Based on the proposed design, the two existing catch basins and the 21-inch RCP connector pipes at the sump of Arlington Street will not require any modifications.

Evaluation of the Proposed Project Based on a 10-year Frequency Storm

The proposed 5-year storm drain system was analyzed to determine the level of flooding if a 10-year frequency storm occurred. The 10-year reported flow rate at the intersection of River Avenue and Arlington Street is 144 cfs. The proposed retention system combined with the existing drain system should be able to accept 105 cfs at the intersection. The excess surface runoff of 39 cfs will be above the property lines on River Avenue and Arlington Street. Assuming the same 50 percent split of excess runoff, the flooding on the Arlington Street sump will be 1.3 feet above the property line.

Alternative Project for a 10-Year Frequency Storm

A retention system for a 10-year frequency protection consists of 3,148 linear feet of 72-inch diameter RCP or HDPE and 317 linear feet of 30-inch diameter RCP or HDPE with seven additional catch basins. The costs would be \$2,400,000 for RCP and \$1,600,000 for HDPE.

Hydrology

A hydrology report dated November 8, 2005, was prepared for 2-, 5-, 10-, and 25-year frequency design storms (copy attached).

Right of Way

Permanent drainage, as well as temporary construction easements, will be required for the construction of the linear retention system. The City of Long Beach will be acquiring the right of way.

Utilities

Waterlines and gas lines on River Avenue will be relocated for this project.

Traffic

There is minor traffic impact on this project since most of the work will be constructed on private property. A traffic control plan will be required on River Avenue.

Environmental Assessment

A Phase I environmental assessment will be required to construct the retention system. No regulatory permits are needed.

Environmental Documentation

The City will determine the approximate California Environmental Quality Act document for this project.

Project Cost Estimate

The construction cost for Phase I (catch basin upgrades) is approximately \$35,000 not including contingencies, utility relocations, and right-of-way costs.

The estimated construction cost for Phase II (retention system with a 5-year frequency storm protection) is \$1,000,000. If HDPE is substituted as an alternative for RCP, the estimated contract bid price would be about \$700,000. The estimated cost for the alternate 10-year frequency storm retention protection is \$2,400,000. If HDPE is substituted as an alternative for RCP, the estimated cost would be \$1,800,000. These costs were based on June 2006 prices.

The cost for preparing the contract plans for the entire project including soils report, environmental assessments, geotechnical investigations, utility coordination, and project management is estimated at \$130,000. The costs for contract administration and construction inspection are an additional \$125,000. The total cost for the proposed 5-year storm project is approximately \$1,255,000.

JK:skh

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